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| **Lesson Title:** Identifying Water Lab |
| **Subject area / course / grade level:** Any grade will work for the structure of the lab: standards fit closest to 8th grade |
| **Introduction:** This lesson can be used for 8th grade to identify chemical and physical properties or a compound. Or it can be used only to work on testing procedures and can be done with any grade. Either way, it will be used to identify a substance (water) based on its properties. |
| **Lesson Length:** 1 class (approximately 45 mins) |
| **Materials:**  Paper  Pencil  Graduated cylinders w/ holding containers: 5-6 per group / You can use beakers instead if you want to give them more liquid and allow more tests.  5 - 6 clear liquids – water is the only one required. others can be sprite, rubbing alcohol, peroxide, mineral oil, or white vinegar.  worksheet  various other supplies based on what tests you want to perform |
| **Lesson Overview:**  Students will run a series of basic tests to identify a substance based on its chemical and physical properties. |
| **Tennessee Standards:**  SPI 0807.Inq.1 – Design a simple experimental procedure with an identified control and appropriate variables.  SPI 0807.Inq.2 – Select tools and procedures needed to conduct a moderately complex experiment.  SPI 0807.Inq.3 – Interpret and translate data in a table, graph, or diagram.  SPI 0807.9.8 – Interpret the results of an investigation to determine whether a physical or chemical change has occurred. |
| **Lesson objective(s):**  To be able to identify objects based on their specific properties through a series of tests. |
| **ENGAGEMENT**  I usually introduce the concept to students by telling them that they are out of resources (lost in a desert or on another planet or something) and dangerously close to dying of thirst. They have been given 5 – 6 liquids, but only 1 of them is water. If they can identify the water they will be fine, but if they can’t find the water they will die. They have enough time to conduct some tests to help them choose, but once they choose it is over. |
| **EXPLORATION**  Before class:  Have sets of 5-6 graduated cylinders set up for each group. Have them numbered and make a key to help you remember which liquids are in the given GCs. Put one liquid in each cylinder.  In class:  After the intro, give each group a set of GCs. They are going to perform a series of tests on the liquids to help identify water.  Tests:  You can pick which tests you want them to perform. They can include  1) dissolving substances (sugar, salt, food coloring, etc.)  2) reactions w/ substances – baking soda, aluminum foil  3) basic properties – boiling point freezing point, density (things floating in it, etc.), hold together on wax paper in a bubble |
| **EXPLANATION**  Students should be able to explain how they can tell the liquids apart based on characteristics. They should be able to explain how they can tell them apart during individual tests, how they can eliminate certain options, and how they can finally narrow it down to their last option of water. |
| **ELABORATION**  Vocabulary can include any words based on the tests you want them to run. Necessary vocabulary would have to be chemical property, physical property, boiling point, freezing point, control, variable, etc.  Elaboration would include any extra experiments they could do to eliminate liquids easier, extra liquids that could be added to make the experiment harder.  Daily application would be evident in the processes of identifying substances and finding ways to tell things apart. |
| **EVALUATION**  The most basic evaluation would be if they properly identify the water sample. Monitoring progress would obviously be another. Writing after the project would also be a god evaluation, to see if they could explain the processes they performed in order to get the results. |